



ANCHOVY AND SARDINE STATUS IN ADRIATIC SEA

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ANCHOVY

the assessment performed was an update of the benchmark finalized in 2020 with the addition of two extra years of data, thus all assumptions and model settings were kept unvaried.

- Anchovy are fished by purse seiners and pelagic trawlers belonging to Italy, Croatia and, to a much smaller extent, Albania, Montenegro and Slovenia.

The Italian fleet is composed of about 104 midwater pelagic trawlers and about 22 purse seiners. Croatia has 168 authorized purse seiners fishing small pelagics, fishing mainly sardine. Albania, Montenegro and Slovenia have respectively 27, 29 and 4 fishing vessels authorized to fish small pelagic in GSAs 17 and 18.

Exploitation is based on all the age classes from 0 to 3+.

Catch at age from the different countries are summed together; the considered time series goes from 2000 to 2021.

Acoustic surveys data were available and used as tuning indices of abundance at age from 2004 to 2014 for the Western side of GSA 17 (Italy and Slovenia), and for GSA 18 West (Italy) and East (Albania and Montenegro), from 2015 to 2021 for the Western side of GSA 17 and whole GSA 18 and from 2013 to 2021 for the Eastern side of the Adriatic Sea (Croatia).

Croatian national PELMON survey data on anchovy biomass estimates in the GSA17-East, in period 2003-2010, were also available.

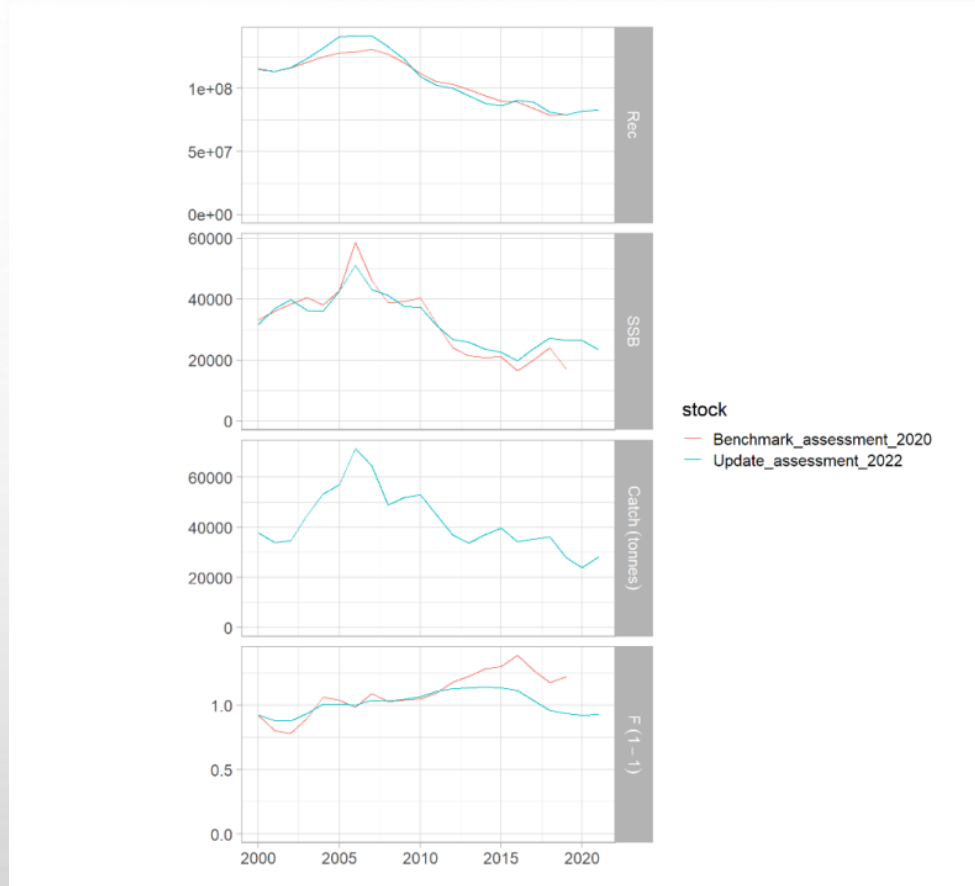
The State-Space Assessment Program (SAM) implemented in FLFR (FLSAM) has been performed to assess the stock status of anchovy in GSAs 17 and 18 from 2000 to 2021.

The stability of the model was tested running a retrospective analysis, which gave consistent results, notwithstanding the different time series of the four surveys could have affected the stability of this analysis. Moreover, the model diagnostics show an improvement of the setting of the model, specifically on the weighted of the different data sources. Assessment model was less driven by catches alone than previous assessments and this was considered an improvement, probably due to enhancements in the catch at age structure and additional years of data.

The fishing mortality for age 1 shows quite **stable** trend over the considered time series reaching the highest value in 2014 (1.140); the 2021 value corresponds to 0.928.

The spawning stock biomass shows an **increasing** trend up to 2006 (51 thousand t) to then decreases continuously to 2016 (20 thousand t) and reaching the value of 24 thousand t in 2021.

Recruitment follows a similar trend with a quite stable trend at the beginning of the time series registering the highest value in 2007 (131 million individuals), then a continuous decreasing trend reaching the value of 83 million individuals in 2021.



The assessment was considered validated with quantitative advice.

The stock is in overfishing status ($F/F_{msy}=1.15$) with biomass above the reference points ($B/B_{pa}=1.10$, $B/B_{lim}=1.45$).

The advice is to reduce fishing mortality.

SARDINE

Attempted assessment with last years model settings with added two more years of data, also additionally one more setting tried

Same fishing vessels as for anchovy

Exploitation is based on all the age classes from 0 to 3+.

There is one number at age matrix used and one weight at age used (calculated as percentage of each country number at age in total times weight at age of that country and added all together).


All the acoustic survey data are used as number at age as provided, except number at age data from MEDIAS survey in GSA17-East. The number at age data in this case were calculated by WGSASP from survey LFD in combination with ALK from commercial fisheries, and not used as provided by Croatia




Model attempted is a4a with same settings as last assessment.

The assessment presents all the uncertainties and problems detected in the previous evaluation (e.g. information on ages scarce, potential issues related to trends on mean length and age data, low cohort signals confounded with trends), that require urgent actions


Also, the residual pattern did not show any major deviation, it was obvious that model is relying on the catch data and not integrating data from survey (additionally shrank in ages).

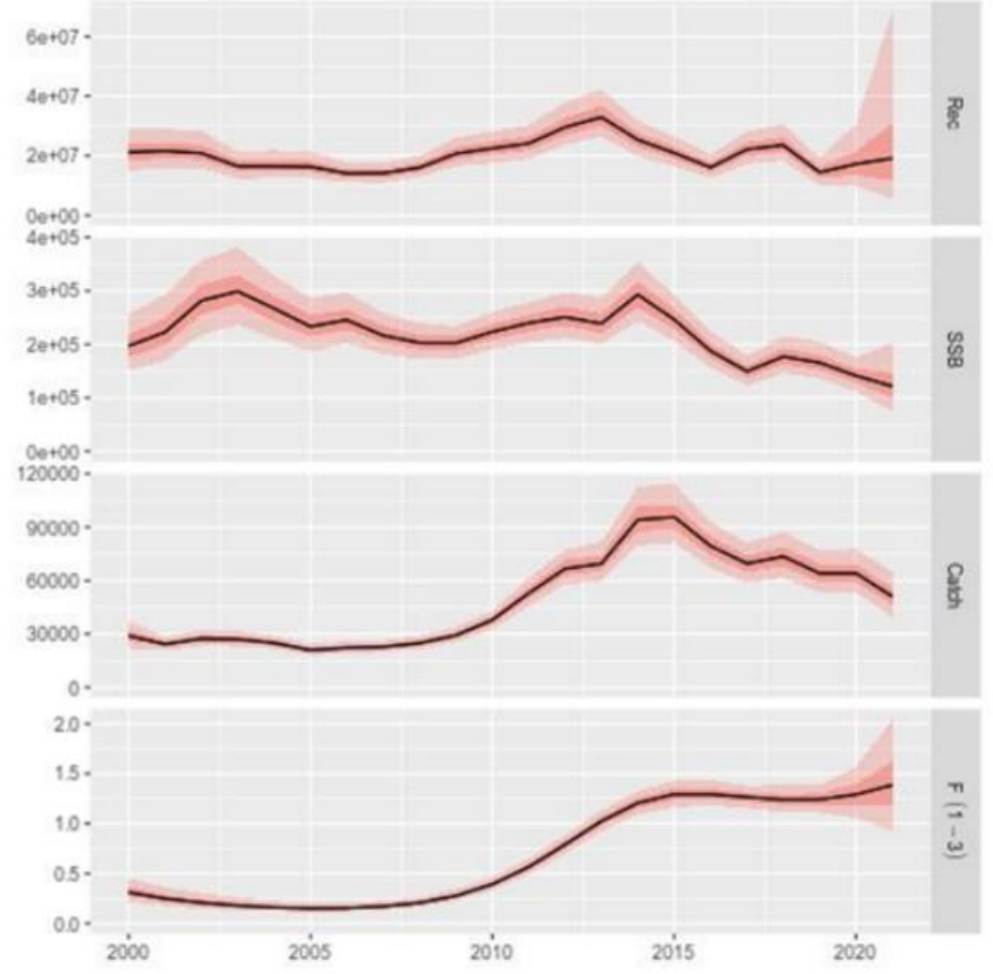
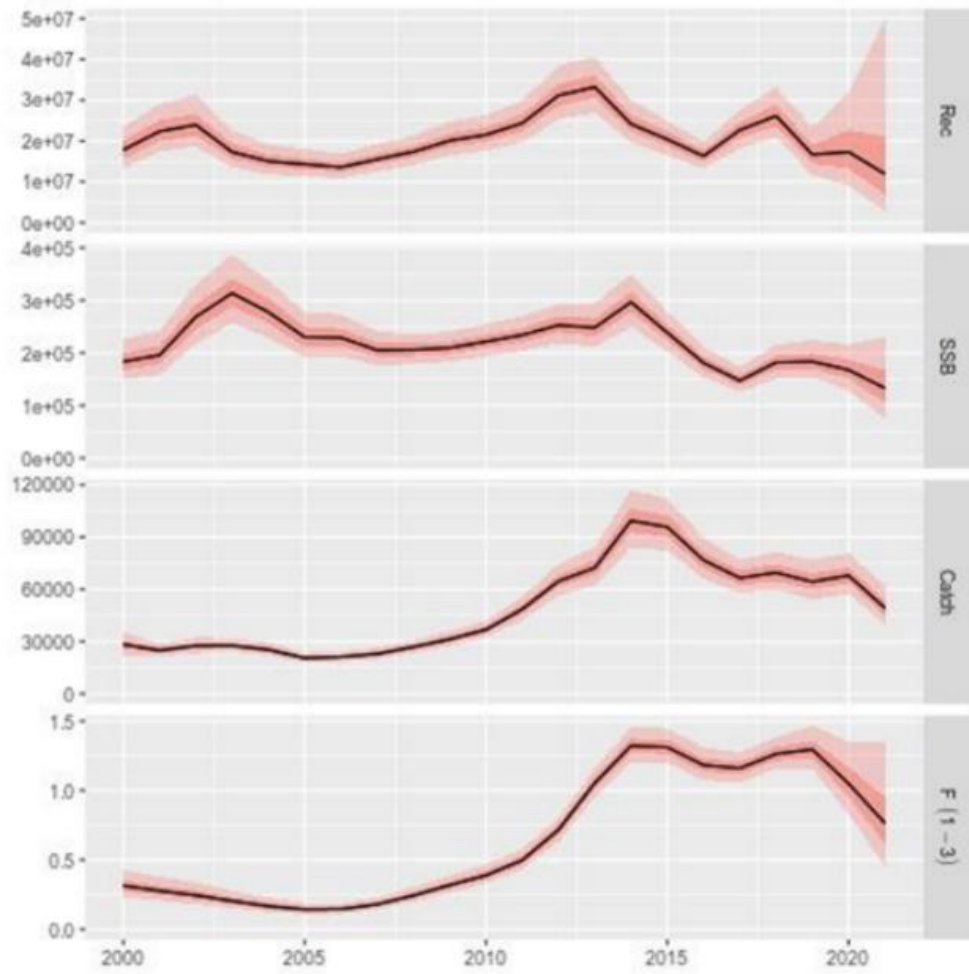




Results of the model showed a decreasing trend in biomass. Two different attempts of model performances showed different trend in fishing mortality and recruitment, marking instability of the assessment. Also, in both attempts' retro was not stable indicating the lack of reliability in these assessment outputs.

This assessment was marked as not reliable and advice was given on the precautionary level presuming possible decreasing trend in spawning stock biomass. Hence, stock had not improved since the last assessment and was still deemed to be overexploited and in overexploitation.







To do list:

- ✓ Otolith exchange- difference in reading, in particular for advance readers, is not significant, although it is still below 80% (October)
 - ✓ Reread otoliths from past and built ALK (October-November)
 - Built new number at age matrix (November)
 - Explore use of different model using number at length matrix (up to February)
 - Perform benchmark assessment and MSE (February)
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